

# What Did They Call the Duck Who Became a Test Pilot?

Follow the directions given for each section. Cross out each box in the rectangle below that contains a correct answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

I For each function, find the indicated values.

- |                                |            |            |
|--------------------------------|------------|------------|
| ① $f(x) = 2x - 5$              | A. $f(6)$  | B. $f(1)$  |
| ② $f(x) = x^2 - 4$             | A. $f(12)$ | B. $f(-2)$ |
| ③ $g(x) = x^2 - 7x + 1$        | A. $g(3)$  | B. $g(0)$  |
| ④ $h(x) = \frac{x+3}{x^2+x-6}$ | A. $h(4)$  | B. $h(-1)$ |

II Find the range of each function for the given domain.

- |                                   |                     |
|-----------------------------------|---------------------|
| ⑤ $f(x) = 3x + 2$                 | $D = \{-2, 0, 2\}$  |
| ⑥ $g(x) = 9 - 5x$                 | $D = \{-3, -1, 1\}$ |
| ⑦ $F(x) = 2x^2 - 1$               | $D = \{5, 1, -4\}$  |
| ⑧ $h(x) = x^2 - 8x + 3$           | $D = \{1, 0, -1\}$  |
| ⑨ $f(t) = \frac{t^2 + 4t}{t - 6}$ | $D = \{4, 0, -4\}$  |
| ⑩ $G(n) = -n^2 + 2n + 3$          | $D = \{-2, 1, 4\}$  |

SK	Y	S	AF	E	IL	LY
{49, 1, 31}	0	$\frac{1}{2}$	{49, -1, 9}	{-16, 0}	7	{-16, 8, -2}
BE	ER	ST	QU	IT	I	A
{24, 14, 4}	{-5, 0}	{-5, 4}	$-\frac{3}{2}$	$-\frac{1}{3}$	-3	{24, 14, -7}
DU	CK	MB	IN	H	ER	UP
-11	{-4, 7, 12}	140	{-4, 2, 8}	{-4, 3, 12}	{-4, 2, -1}	1

176 ALGEBRA WITH PIZZAZZ!  
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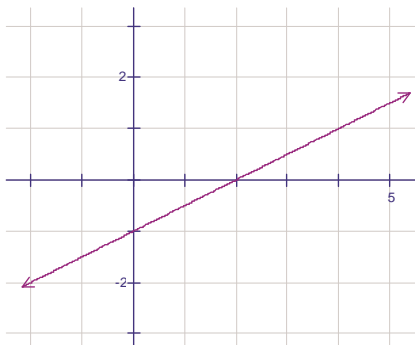
OBJECTIVE 1-b: To find values of a function; to find the range of a function for a given domain.

## More Function Notation

1. Evaluate  $f(4)$  for each of the following

a)  $f = \{(0,1), (3,-2), (4,5), (7,1)\}$  c)

b)  $f(x) = 2x^2 - 3x + 6$



d)

x	y
-6	10
0	12
4	14
7	19

2. Given  $g(x) = 5x - 1$  evaluate:

a)  $g(2-6)$

b)  $g(2) - g(6)$

3. Given  $h(x) = 3x^2 - x + 2$ , evaluate:

a)  $h(4x)$

b)  $h(-2x)$

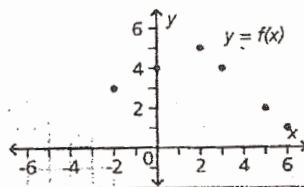
c)  $h(x-1)$

## Extra Function Notation

1. The graph of  $y = f(x)$  is shown.

- i. State the domain and range of  $f$ .  
ii. Evaluate.

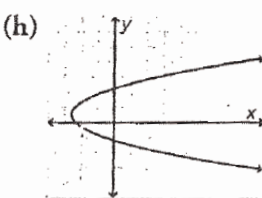
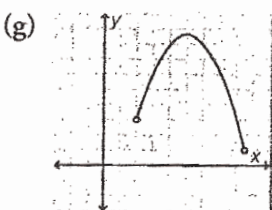
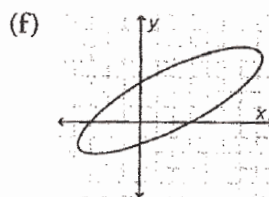
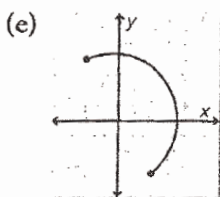
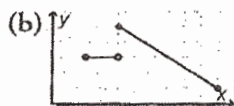
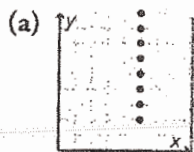
- (a)  $f(3)$  (b)  $f(5)$   
(c)  $f(5 - 3)$  (d)  $f(5) - f(3)$



- 2A For  $g(x) = 3 - 2x$ , find

- (a)  $g(3)$  (b)  $g(0)$  (c)  $g(-2)$  (d)  $2g(1)$   
(e)  $g(-2) - 3$  (f)  $g(-2 - 3)$  (g)  $g(a)$

- 2B State whether each graph shows a function. Justify your answer.



3. Consider the function  $g(t) = 3t + 5$ . Determine each value.

- (a)  $g(0)$  (b)  $g(1)$  (c)  $g(2)$   
(d)  $g(3)$  (e)  $g(1) - g(0)$  (f)  $g(2) - g(1)$   
(g)  $g(3) - g(2)$  (h)  $g(1001) - g(1000)$  (i)  $g(a + 1) - g(a)$   
(j)  $\frac{g(4) - g(0)}{4 - 0}$

4. The adjacent table lists all of the ordered pairs belonging to a function  $g$ .

- i. Determine the equation of the line that passes through these points.  
ii. Write  $g(x)$ .  
iii. Evaluate.

- (a)  $g(5)$  (b)  $g(5 - 3)$   
(c)  $g(5) - g(3)$  (d)  $2g(3) - 5$

$x$	$y$
1	5
2	7
3	9
4	11
5	13

5. Consider the function  $f(s) = s^2 - 6s + 9$ .

Determine each value.

- (a)  $f(0)$
- (b)  $f(1)$
- (c)  $f(2)$
- (d)  $f(3)$
- (e)  $f(4)$
- (f)  $f(1) - f(0)$
- (g)  $f(2) - f(1)$
- (h)  $f(3) - f(2)$
- (i)  $f(4) - f(3)$
- (j)  $[f(2) - f(1)] - [f(1) - f(0)]$
- (k)  $[f(3) - f(2)] - [f(2) - f(1)]$
- (l)  $[f(4) - f(3)] - [f(3) - f(2)]$
- (m)  $[f(1002) - f(1001)] - [f(1001) - f(1000)]$

6. A relation is defined by  $x^2 + y^2 = 25$ .

- (a) Sketch a graph of the relation.
- (b) Is this relation a function? Explain.

7. For each of the following,

- i. graph the relation
- ii. state the domain and range
- iii. is the relation a function? Why or why not?

- (a)  $y = 3x - 1$
- (b)  $y = 10 - 4.9x^2$
- (c)  $y = 3(x - 2)^2 - 5$
- (d)  $y = \frac{1}{x^2}$
- (e)  $x^2 - y = 3x$
- (f)  $y = x(x - 4)$
- (g)  $5x + 3y = 15$

## **Solutions:**

### **More Function Notation:**

1. a)  $f(4)=5$  b)  $f(4)=26$  c)  $f(4)=1$  d)  $f(4)=14$
2. a)  $g(2-6)=-21$  b)  $g(2)-g(6)=-20$
3. a)  $48x^2 - 4x + 2$  b)  $12x^2 + 2x + 2$   
c)  $3x^2 - 7x + 6$

### **What Did they Call the Duck....**

A Flyer Quacker

### **Extra Function Notation**

1. i.  $D = \{-2, 0, 2, 3, 5, 6\}$ ,  $R = \{1, 2, 3, 4, 5\}$  ii. 4, 2, 5, —2;
2. **A** (a) -3 (b) 3 (c) 7 (d) 2 (e) 4 (f) 13 (g)  $3 - 2a$
2. **B** (a) not a function: fails vertical line test  
(b) function: passes vertical line test  
(c) function: passes vertical line test  
(d) not a function: fails vertical line test at end points  
(e) not a function: fails vertical line test at right-hand part of curve
3. (a) 5 (b) 8 (c) 11 (d) 14 (e) 3 (f) 3 (g) 3 (h) 3 (i) 3 (j) 3
4. i)  $y = 2x + 3$  ii)  $g(x) = 2x + 3$  iii) 13, 7, 4, 13
5. (a) 9 (b) 4 (c) 1 (d) 0 (e) 1 (f) -5 (g) -3 (h) -1 (i) 1 (j) 2 (k) 2 (l) 2 (m) 2
6. (a) circle centered on origin, radius 5  
(b) not a function: fails vertical line test for all values of  $x$  between -5 and 5.
7. (a) straight line through (0, -1) and (2, 5);  $D = \{R\}$ ,  $R = \{R\}$ ;  
function: passes vertical line test  
(b) parabola opening downward with vertex (0, 10) through (-1.4, 0) and (1.4, 0);  
 $D = \{R\}$ ,  $R = \{y / y \leq 10, y \in R\}$  function: passes vertical line test  
(c) parabola opening upward with vertex ((2, -5) through (0, 7) and (4, 7);  
 $D = \{R\}$ ,  $R = \{y / y \geq 5, y \in R\}$  function: passes vertical line test  
(d) curve in first quadrant down to right through (1, 0), curve in fourth quadrant down to left through (-1, 1);  $D = \{x / x \neq 0, x \in R\}$   $R = \{y / y > 0, y \in R\}$   
function: passes vertical line test  
(e) parabola opening upward with vertex (1.5, -2.25) through (0, 0) and (3, 0);  
 $D = \{R\}$ ,  $R = \{y / y \geq -2.25, y \in R\}$  ; function: passes vertical line test  
(f) parabola opening upward with vertex (2, -4) through (0, 0) and (4, 0);  
 $D = \{R\}$ ,  $R = \{y / y \geq -4, y \in R\}$  function: passes vertical line test  
(g) line through (0.5) and (3, 0);  $D = \{R\}$ ,  $R = \{R\}$ ; function: passes vertical line test